

CENTRAL INTELLIGENCE AGENCY  
PROPOSED OFFICE BUILDING  
N-182  
LANGLEY, VIRGINIA

S P E C I F I C A T I O N S  
for  
PNEUMATIC TUBE WORK

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SPECIFICATIONS  
for  
PNEUMATIC TUBE WORK

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SPECIFICATIONS

for

PNEUMATIC TUBE WORK

SECTION A

GENERAL REQUIREMENTS

A-01 GENERAL

a. Requirements of General Conditions and Special Conditions for Mechanical and Electrical Work govern work under these specifications.

b. Specifications are of simplified form and include incomplete sentences. Omission of words or phrases, such as "The Contractor shall", "shall be", "provide", "furnish", "a", "an", "the", and "all", are intentional. Omitted words or phrases shall be supplied by inference.

A-02 SCOPE OF WORK

All required labor, materials, equipment, and Contractor's services necessary for complete installation of Automatic Selective Pneumatic Tube System in full conformity with requirements of all Authorities having jurisdiction; all as indicated on drawings and/or herein specified, including in general the following:

- a. System A: One 4" diameter automatic switch system of 111 stations.
- b. System B: One 4" diameter automatic switch system of 36 stations.
- c. System C: One 4" diameter automatic switch system of 25 stations.

A-03 DESCRIPTION OF WORK

a. Purpose of systems is to provide rapid positive communication between locations in building where sending and receiving stations are located. Systems shall be by manufacturer regularly engaged in production of conventional and automatic tube equipment.

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b. System shall consist of (1) a number of airtight tube loops connecting each station through automatic central transfer point with carriers which can be set to travel to any given station; (2) air exhausters to supply motive power to carriers; (3) automatic switches to direct carriers into their correct station - automatic switches shall be activated by carriers; (4) combination receiving and sending stations; (5) carriers with adjustable rings; (6) electrical controls including "direct contact" brushes which, when contacting carrier, will complete electrical circuit.

#### A-04 DEFINITIONS

Definitions of terms used herein:

a. "Furnish" or "provide": To furnish, erect, install, and connect up complete and ready for regular operation particular work referred to, unless specifically noted or specified otherwise.

b. "Work": All labor, materials, equipment, apparatus, controls, accessories, and all other items customarily furnished and/or required for proper and complete installation of work.

c. "Wiring": Conduit, fittings, junction and outlet boxes, switches, cutouts, receptacles and all items necessary or required in connection with or relating to such wiring.

d. "Indicated" or "shown": As indicated or shown on drawings.

e. "Noted": As indicated on drawings and/or specified.

f. "Similar" or "equal": Equal in kind, quality and function, of approved manufacture as provided by Article "Approvals" of Special Conditions for Mechanical and Electrical Work.

g. "Approved", "satisfactory", "directed", "accepted", or forms thereof: As approved, satisfactory, directed, or accepted by or to Architect.

#### A-05 CODES

Unless specifically excepted, all designs, clearances, construction, workmanship, and materials shall comply with applicable requirements of latest codes having legal jurisdiction. (Building Codes; National Electrical Code, etc.).

#### A-06 WORK NOT INCLUDED

a. Main power supply wiring to disconnect switch within 25 feet of each compressor.

- b. Auxiliary electrical supply wiring to within 10 feet of each station, central transfer point and compressor.
- c. Access panels as required to switch assemblies, etc.
- d. Painting in other than manufacturer's standard finishes.
- e. All cutting and patching of beams, walls, and masonry work required, including repairs to plaster; also all chases and openings, as required and indicated.
- f. Installation of all concrete foundations and bases for equipment and setting of anchor bolts.
- g. Furnishing and setting of all required wall and ceiling sleeves and plates.

#### A-07 ELECTRICAL SUPPLY

- a. Power: 440 volts, 3 phase, 60 cycle, 3 wire.
- b. Auxiliary: 120 volts, single phase, 60 cycle.

#### A-08 PAINTING

- a. Paint: Deliver to building in manufacturers' original sealed containers; best grade, and applied in accordance with manufacturer's directions.
- b. Metal surfaces, whether painted in shop, factory, or in field: Wire brush and clean of dirt, rust, grease, or foreign matter before prime coat.
- c. Paint metal surfaces not lacquered one prime coat.
- d. All motors and machinery: Standard factory coat.

#### A-09 TESTING

After all equipment, tubing, etc., are installed, Contractor shall test same and put system in operation to entire satisfaction of Architect. Tests shall be witnessed by Architect's appointed representative.

#### A-10 SHOP DRAWINGS

- a. After contract has been awarded and before detailed shop drawings are submitted, Contractor shall submit, for preliminary approval, a list of manufacturers' names of all material and equipment to be furnished.

b. After awarding of contract, shop drawings showing details of station layouts, compressor types and installation with manifolds and air piping, and detailed arrangement of central transfer points. These shop drawings will be subject to approval by Owner and/or Architect and Engineer before starting installation work and producing equipment.

#### A-11 GUARANTEE

Contractor shall guarantee successful operation of system. Contractor shall repair or replace any defective parts due to poor workmanship, or design, for period of one year. Ordinary wear and tear, particularly on carriers, shall be excluded from Contractor's guarantee.

#### A-12 OPERATING INSTRUCTIONS AND MANUALS

a. At termination of contract work and completion of all tests, Contractor shall supply services of a competent instructor to advise Owner as to proper operation and maintenance requirements of systems. These instructions shall be conducted continuously for a two-week period.

b. Contractor shall prepare and supply to Owner 20 copies of an instruction manual, two weeks before instruction period begins, so that Owner's personnel may have opportunity to study it. Manual shall contain following:

1. Complete operating instructions.
2. Complete maintenance instructions.
3. Complete installation instructions for repair or replacement of parts.
4. Complete catalog list of spare parts.
5. Complete wiring diagrams.

#### A-13 CLEANING

Contractor shall clean up all debris caused by his work and leave premises in clean and orderly condition.

#### A-14 ERECTION

Contractor shall provide all necessary rigging, scaffolding, tools, tackle, labor, etc. which may be necessary for complete installation of equipment, ready for service in accordance with intent of these specifications.

b. Contractor shall have a competent erecting engineer

on job to supervise installation work and to consult with Owner as to proper execution and conduct of work under this contract, so that same may be carried on as rapidly as possible and in cooperation with other work that may be going on at the building at such time.



SECTION B

EQUIPMENT

B-01 GENERAL

a. Equipment and electrical circuits furnished shall be standard product of supplier or approved equal.

b. Contractor shall install, complete, in operative condition, to approval of Architect, materials contemplated in these specifications and/or shown on drawings.

B-02 CENTRAL TRANSFER POINTS

a. High speed type with sufficient receiving and sending lines. Each system shall have capacity to accommodate 9600 carriers per 8-hour day.

b. Central transfer point shall be equipped with carrier magazines, one for each incoming sending line, allowing simultaneous arrival and piling up of several carriers at one time in each loop.

c. Carriers incorrectly dialed for a non-existing station or non-existing line shall be automatically rejected at central transfer point and shall go to reject station.

d. Where more than one central transfer point is required for one system, transfer points shall be interconnected so that carriers received in one destined for stations on the other will be automatically transferred as required.

e. Central transfer points, each with its relay panels and control devices, shall perform following functions:

1. Govern operation of system to handle specified traffic capacity including surges.

2. Test and sort incoming carriers as to their destinations.

3. Space carriers.

4. Automatically dispatch improperly dialed carriers to reject station.

5. Direct carriers to proper outgoing receiving lines.

6. Count number of carriers passing through each line.

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### B-03 STATIONS

a. Unless otherwise indicated, all stations shall be recessed wall type consisting of a floor-to-ceiling unit, including sending and receiving terminals, storage space for 5 empty carriers and indicating lamps which will light whenever there is a carrier in receiver.

b. Compartments into which carriers discharge shall be made of #13 USSG furniture steel, welded construction. Hinged access door shall be fitted with 3-way combination manipulation-proof lock. All bolts or screws shall be peened or welded on inside of compartment.

c. Receiver compartment shall be arranged so that carriers roll out of path of succeeding carriers as they are ejected from tube. Compartment shall have capacity for receiving and storing 4 carriers without interfering with normal operation of system.

### B-04 CARRIERS

Furnish 510 carriers with minimum clear inside dimensions of 2-1/2 inches diameter and 12-1/2 inches long. Carriers shall be automatic switch type having series of dial rings along body of carrier. Setting of dial rings on carrier shall make an electrical circuit. Carrier passing through a station having contacts spaced the same distance as ring setting on carrier shall complete the electrical circuit causing carrier to deliver to that station.

### B-05 TUBING

a. Tubing shall be 4" O.D. #16 (0.065") Stubs Gauge electric welded steel, one end expanded to receive plain end of succeeding length, specially manufactured for pneumatic tube transmission with coat of clear lacquer on inside and outside.

b. All joints shall be made airtight by suitable compound; all excess to be wiped clean.

### B-06 BENDS

Bends shall be made of same material as straight tubing, formed on maximum radius of 60 inches, held to true circular section throughout. Where limited space does not permit use of tube bends, 24" radius expanded metal bends may be used; 24" radius bends will only be permitted at top or bottom of risers where carrier travel is downward. All bends must allow free travel of carrier without binding. Bends shall be joined by solid sleeves.

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## B-07 SUPPORTS

a. Horizontal tubing shall be supported at not less than 10'-0" intervals. Bends shall be supported at both ends. Tubing and bends shall be braced to insure a rigid installation, free from sway or distortion due to carrier travel.

b. Hangers shall be constructed of 3/8" diam steel rods, screwed into expansion shields inserted into concrete slab at one end and into tube support at other end.

c. All runs shall be straight, level and plumb. Tubing passing through floors shall be supported by cast metal floor clamps.

## B-08 ELECTRICAL WIRING

Unless otherwise specified, furnish all electrical wiring required to complete the system. Wiring shall be run in rigid conduit and shall conform with local code requirements.

## B-09 AIR PIPING

a. Furnish necessary copper bearing galvanized sheet steel air pipe and manifold connected to intake side of each exhaustor. Pipe shall be of ample diameter for maximum air velocity not to exceed 3,000 fpm and shall be riveted and soldered airtight. Air shall exhaust at exhaustors into mufflers.

b. Air intake at end stations on ingoing lines shall be taken through 4" diameter tubing and fittings from within ceiling area above or below station.

## B-10 MUFFLERS

Furnish muffler, similar to Koppers, on each exhaustor, of sound-trap type with mineral slag and metal septum type resonators, or lined with hair-felt, 1" thickness, held in place by chicken wire.

## B-11 COMPRESSORS

Furnish sufficient number of compressors, with required starters, with ample vacuum and volume to provide average carrier velocity of 25 feet-per-second in all lines under peak and surge load conditions.

## B-12 AIR REGULATORS - CLEAN-OUT SCREENS

a. Provide each air circuit with adjustable butterfly gate in accessible location to regulate air for each line. Gate shall be of cast metal with means for adjusting, calibrat-

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ing, marking, and holding setting, without use of special tools.

b. In accessible location, ahead of each air regulator, furnish clean-out screen in cast housing with removable gasketed access cover. Screening shall be 1/4 mesh galvanized hardware and shall be fitted so as to be removable for cleaning.

c. All castings shall be bored to receive connecting air tubing and provide smooth airtight fit. Use sealing compound to insure against air leakage.

#### B-13 GAUGES

Furnish mercury U gauge with scale calibrated in ounces of vacuum on intake pipe at each exhaustor. Mount gauges so that scales are readily visible.

#### B-13 BASES AND ANCHOR BOLTS

a. Furnish vibration pads, properly loaded for all compressors, and any other equipment which will cause noise or vibration to be transmitted.

b. Furnish all anchor bolts and sleeves of adequate size and length to properly anchor all equipment.

c. Submit drawing for installation of concrete foundations and bases and for placement of anchor bolts and sleeves.

SECTION C

OPERATION

C-01 GENERAL

- a. Dispatching of a carrier at any station in system shall cause it to go automatically to station designated by dial setting on carrier with no manual assistance between sending station and receiving station.
- b. Central transfer point shall read carrier and route it to line on which designated station is located with no manual assistance.
- c. Arrival of carrier at receiving station shall be announced by light signal.
- d. Carrier shall be dialed and dispatched to home station immediately after contents are removed and cover closed. Home station number shall be branded on each carrier.
- e. Station selectors located ahead of deflector switch assemblies, shall contain brushes set in position to energize individual solenoids in deflector switch assemblies at stations. Carriers shall be set for intended station by turning dials on carrier to number of destined station. This action shall complete an electrical circuit between rings on carrier spaced same distance apart as brushes in station selector. Carrier passing through proper station selector, and set for that selector, shall complete electrical circuit through brushes, causing a relay to be energized. Relay shall, in turn, energize solenoid in deflector switch assembly; solenoid shall actuate deflector causing carrier to drop into station. This electrical operation must be accomplished in a fraction of a second so that deflector is fully opened before carrier reaches deflector switch assembly. A circuit breaker shall be engaged by passing carrier, causing relay and solenoid to be de-energized and deflector shall return to its normally closed position. Entire operation must be performed rapidly, carriers maintaining full velocity in transmission tube thereby permitting successive carriers injected by central transfer point and destined for stations beyond to pass along main branch without interference. Each deflector switch assembly shall be equipped with power unit to operate switch. Primary power characteristics shall be for 110 volts, 60 cycle, 1 phase alternating current.
- f. Furnish 2 separate valves in transmission tubing above terminal receiving compartment, to insure positive carrier delivery into compartment even though door is open.
- g. Station unit shall be properly soundproofed and exposed surfaces finished in manufacturer's standard finish.

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SECTION D  
SUPERVISORY CONTROLS

D-01 GENERAL

Bidders have option of submitting separate price for additional automatic supervisory light signal panels, controls, alarms, etc., for pneumatic tube systems as described.

a. When a compressor fails, sender locks operate to prevent inserting carriers into line. Signal panel in centralized location will indicate failure.

b. When a sending line is blocked the sender locks operate. Signal panel in centralized location will indicate blocked sending line and location.

c. When a receiving line is blocked, central point shall not dispatch additional carriers into line but reject carriers. Signal panel in centralized location shall locate destination of last carrier in line to pinpoint location of jam.

d. When a blockage occurs in central transfer point, sending terminals of lines involved shall lock. Signal panel will indicate blockage.

e. When any fuse blows in system, signal panel shall indicate failure.

f. All indications on signal panel shall be relayed to alarm buzzer in Maintenance Office.

SECTION E  
ALTERNATE PRICES

E-01 GENERAL

State in proposal amount to be added to or deducted from base bid for work comprised under each Alternate Price specified.

E-02 ALTERNATE PRICE NO. 1

Furnish all additional equipment, controls, etc., that would permit carriers dispatched from System "B" to discharge at any station on System "C", but would not permit carriers dispatched on System "C" to discharge at stations on System "B".

E-1